Adult Environmental Emergencies: Decompression Sickness

Note Well: *Decompression sickness (DCS) results from gas coming out of solution in the bodily fluids and tissues when a diver ascends too quickly. Additionally, the expansion of gas in the lungs may lead to alveolar rupture, known as Pulmonary Overinflation Syndrome, which may result in arterial gas embolism (AGE).*

DCS can also occur if the individual flies in an aircraft within 12-24 hours after diving.

I. Background

1. DCS is divided into Type I, Type II, and Type III.

   A. Type I includes cutaneous manifestations and minor joint pain.

   B. Type II includes severe symptoms related to the cardiopulmonary and neurological symptoms.

   C. Type III is a combination of AGE and DCS with neurological symptoms.

2. Type I (Pain syndrome) are typically located in the limbs, not central skeleton.

   A. It is typically described as dull, difficult to characterize and localized.

   B. Typically located in the shoulders, elbows and hands.

   C. Mild pains begin to resolve within 10-minutes of onset (niggles).

   D. Pruritus or “skin bends” cause itching or burning sensation of the skin.

I. Background (continued)

E. Pain occurs in the majority (70-85%) of the patients with Type I DCS.

F. Upper limbs are affected 3 times as often as lower limbs.

Note Well: *To assist in the determination of DCS, a large blood pressure cuff can be placed over the area of pain and inflated to 150-250 mmHg. In patients with nitrogen bubbling in the joint or tendons, this increase can force some of the nitrogen back into solution, resulting in a temporary decrease in pain*.

3. Type II (Neurological syndrome) is characterized by pulmonary symptoms, hypovolemic shock or nervous symptom involvement.

A. Spinal cord is the most commonly involved site.

B. Symptoms typically include abdominal, lower back, lower extremity pain, weakness and loss of feeling and function.

C. Cerebral involvement is much more common than previously thought.

D. Peripheral nerves can also be involved causing numbness, limb pains and weakness.

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II. All Provider Levels

1. Refer to the Patient Care protocol.

2. Place the patient in a supine position.

> ***Note Well:*** *Patient should not be placed in a head-down (Trendelenburg) position because it can promote cerebral edema.*

3. Provide 100% oxygen via non-rebreathing mask.

   A. If respiratory effort is inadequate assist ventilations utilizing BVM with 100% oxygen.

4. Initiate advanced airway management with Combi-tube if respiratory effort is inadequate.

> ***Note Well:*** *EMT-I and EMT-P should use ET intubation.*

III. Advanced Life Support Providers

1. Attach EKG monitor and interpret rhythm.

2. Establish an IV of Normal Saline.

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IV. Transport Decision

1. Transport to the closest appropriate open facility that is equipped with a hyperbaric chamber.

> ***Note Well:*** *It may be necessary to call the intended receiving facility prior to transport to ensure that the chamber is functioning and that staff are available to operate it.*

> ***Note Well:*** *If feasible, try to keep all diving gear with diver. Gear may provide clues as to why the diver had trouble (eg, faulty air regulator, hose leak, etc).*

V. The Following Options are Available by Medical Control Only

1. Diazepam (Valium) 5-10 mg to control dizziness, instability and visual disturbances associated with vestibular damage to the inner ear.

2. Aspirin, 650 mg for antiplatelet activity if patient has no active bleeding.

> ***Note Well:*** *DAN (Divers Alert Network) is an excellent resource. Use of this service is similar to the use of a Poison Control Center. DAN maintains a database of diving-related injuries and provides 24-hours a day consultation services, including extent of injury assessment, recommendations for management, and referral to hyperbaric therapy or local diving medicine specialists. They can be contacted at*
> - *919-684-8111*
> - *919-684-4DAN (4326)*